

SALMON-TAGGING EXPERIMENTS IN ALASKA, 1927 AND 1928¹

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CONTENTS

	Page		Page
Introduction.....	1	Southeastern Alaska, 1927—Continued.	
Southeastern Alaska, 1927.....	2	Cape Decision.....	15
Icy Strait.....	4	Clarence Strait.....	17
Chatham Strait.....	7	Conclusions.....	18
Frederick Sound.....	10	Uganik Bay, 1927.....	18
Stephens Passage.....	13	Nicholaski Spit, 1928.....	21
Sumner Strait.....	13		

INTRODUCTION

The series of salmon-tagging experiments in Alaska, which was begun in 1922, was continued during the two years covered by this report. In 1927 a number of experiments were conducted in southeastern Alaska and one in Uganik Bay, Kodiak Island. In 1928 an experiment was carried out at Nicholaski Spit on the Alaska Peninsula. The experiments in southeastern Alaska were designed to fill in some of the gaps in the information that had been secured from previous experiments in this district. The other experiments were designed to settle specific questions that had arisen in connection with the administration of the fisheries. Although many details of the salmon migrations yet remain to be discovered, it is our opinion that the general features are now well enough known so that there is little need to continue general tagging experiments of the nature of those performed in southeastern Alaska in 1924 to 1927. It is planned, therefore, to use the method of tagging in the future only in connection with specific problems, such as those at Uganik Bay and Nicholaski Spit, which are covered by this report.

The method of tagging and the results of the earlier experiments have been covered adequately in previous reports.² The experiments in southeastern Alaska in 1927 were conducted by the junior author, who also collected and tabulated the data.

¹ Submitted for publication Mar. 8, 1929.

² Experiments in Tagging Adult Red Salmon, Alaska Peninsula Fisheries Reservation, Summer of 1922. By Charles H. Gilbert. Bulletin, U. S. Bureau of Fisheries, Vol. XXXIX, 1923-24 (1924), pp. 39-50, 1 fig. Washington, 1923. Second Experiment in Tagging Salmon in the Alaska Peninsula Fisheries Reservation, Summer of 1923. By Charles H. Gilbert and Willis H. Rich. *Ibid.*, Vol. XLII, 1926 (1927), pp. 27-75, 12 figs. Washington, 1925. Salmon-Tagging Experiments in Alaska, 1924 and 1925. By Willis H. Rich. *Ibid.*, pp. 109-146, 1 fig. Washington, 1926. Salmon-Tagging Experiments in Alaska, 1926. By Willis H. Rich and Arnie J. Suomela. *Ibid.*, Vol. XLIII, 1927, Pt. II (1929), pp. 71-104, 17 figs. Washington, 1927.

The experiment at Uganik Bay was made by the senior author and that at Nicholaski Spit by L. G. Wingard, assistant agent, Alaska Fisheries Service.

SOUTHEASTERN ALASKA, 1927

These experiments were designed primarily to supplement the data secured in 1924, 1925, and 1926. While, in general, the results have merely confirmed those of previous experiments, it has seemed best to publish the data in full on account of the importance of corroborating our findings. It may be pointed out here that when the results of two or more entirely independent experiments run parallel the probability that they are valid is greater than in the case of a single experiment involving an equal number of individuals. Whenever the new data agree closely with those secured previously, the reader will merely be referred to the earlier reports, which contain adequate discussions that need not be repeated here.

Owing to the exceptionally light run and the late appearance of the fish in all districts, only 4,668 salmon were tagged during the entire season. Commencing in the Chatham Strait and Icy Strait districts, operations were moved gradually southward with the appearance of the fish. The salmon run in the southern district, however, proved to be exceptionally light, and only a few hundred fish were tagged in the vicinity of Gravina Island in Clarence Strait. In all districts the experiments showed the fishing gear to be working very efficiently, and in some instances more than 50 per cent of the fish tagged were recaptured. It was the policy of the bureau to tag the salmon when conditions were most favorable and, whenever possible, just prior to a weekly closed period, thereby giving the fish every opportunity to make headway on their course. A close watch was kept of the fish tagged, and at no time did they appear sluggish or linger around the scene of operations after they were liberated.

The two previous reports (Rich, 1926, and Rich and Suomela, 1927) contain maps showing the distribution of the tagged fish, and it has not seemed necessary to republish these maps here. Those reports also contain lists of minor localities not shown on the maps.

SUPPLEMENTARY LIST OF MINOR LOCALITIES FROM WHICH TAGGED SALMON WERE RECORDED

- Abraham Island. Northern end of Clarence Strait near Etolin Island.
 Ansley Point. Near eastern entrance to Icy Strait, northern shore.
- Benita Passage. Lower end of Etolin Island, between Etolin and Stone Islands.
 Big Johns Bay. Keku Strait.
 Blashke Islands. Kashevarof Passage, northern end of Clarence Strait.
 Bluff Point. Western arm of Behm Canal at the entrance to Yes Bay.
 Boulder Point. Sumner Strait at southern entrance to Keku Strait.
 Breakwater, North and South. Revillagigedo Channel, north of Cape Fox, about latitude 54° 50'.
- Cedar Point. Western shore of Annette Island.
 Clear Point. Northern point of entrance to Funter Bay, Lynn Canal.
 Cosmos Cove. Baranof Island, Chatham Strait, latitude 55° 15'.
 Cube, Point. Admiralty Island, Chatham Strait, latitude 57° 58'.
- Decision, Cape. Southern end of Kuiu Island, Sumner Strait.
 Deer Island. Ernest Sound, latitude 56° 05'.
 Dry Bay. In Portage Bay, Frederick Sound.
 Dry Point. Eastern shore of Stephens Passage, latitude 57° 37'.

- Eagle Creek. Eastern shore of Prince of Wales Island, 1 mile south of Luck Point.
Eagle River. Bradfield Canal.
Ellis, Point. Chatham Strait, northern entrance to Tebenkof Bay.
Escape Point. Western arm of Behm Canal, latitude $55^{\circ} 39'$.
False Island. Cleveland Peninsula, Clarence Strait, below Niblack Point.
Frederick, Port. Icy Strait, Chichagof Island, longitude $135^{\circ} 30'$.
Grand Rapids. Stikine River.
Guard Island. Clarence Strait near northern entrance to Behm Canal.
Gull Point. Onslow Island, Clarence Strait, near the northern end.
Gypsum. Near North Passage Point, Chatham Strait.
Harrington, Point. Etolin Island, Clarence Strait.
Hepburn, Point. Admiralty Island, Chatham Strait, latitude $57^{\circ} 57'$.
Herbert, Port. Chatham Strait, Baranof Island, latitude $56^{\circ} 25'$.
Hollis. Western shore of Twelve Mile Arm, Kasaaan Bay.
Inian Pass, North. Between Inian Islands and the mainland, Cross Sound.
Italio River. Near Yakutat.
Karheen Cove. Karheen Passage, between Hecata and Tuxekan Islands.
Kashevarof Passage. Northern end of Clarence Strait.
Kasnyku Bay. Chatham Strait, Baranof Island, latitude $57^{\circ} 12'$.
Ketchikan Creek. Entering Revillagigedo Channel at Ketchikan.
Kitchen Island. British Columbia. Exact location doubtful.
Kittens, The. Near Funter Bay, Chatham Strait.
Little Pybus Bay. Just south of Pybus Bay, Frederick Sound.
Mansfield Point. Same as Mansfield Peninsula, northern end of Admiralty Island.
March, Point. Southern end of Prince of Wales Island, eastern entrance to Cordova Bay.
Misery Island. Clarence Strait near Lemesurier Point.
Mole Harbor. In Seymour Canal.
Moonshine Point. Chatham Strait, near Point Caution, southern entrance to Hood Bay.
Nelson Point. Behm Canal, entrance to Smeaton Bay.
Peninsular Point. Chatham Strait just north of entrance to Peril Strait.
Pleasant Bay. Seymour Canal, Stephens Passage.
Portage Creek. Kake Harbor, Keku Strait.
Ratz Point. Clarence Strait, north end of Prince of Wales Island, latitude $55^{\circ} 55'$.
Red Bluff Bay. Chatham Strait, Baranof Island, latitude $56^{\circ} 50'$.
Saginaw Channel. Separating Shelter Island from Admiralty Island.
Salisbury Sound. At the western end of Peril Strait.
Selwyn Inlet. Queen Charlotte Islands, British Columbia.
Shelter Island. Saginaw Channel, southern end of Lynn Canal.
Ship Harbor. Clarence Strait, approximately latitude $55^{\circ} 37'$ and longitude $132^{\circ} 12'$.
Snipe Bay. Outer coast of Baranof Island, latitude $56^{\circ} 25'$.
Spacious Bay. Northern arm of Behm Canal near Yes Bay.
Square Cove. Chatham Strait near Cube Point.
St. John Point. Zarembo Island, Sumner Strait.
Three Islands. Clarence Strait, approximately latitude $55^{\circ} 42'$ and longitude $132^{\circ} 14'$.
Vandeput Point. Northern shore of Frederick Sound, longitude 133° .
Vegas Islands. Between Duke and Annette Islands, Clarence Strait.
Wolf Creek. Clarence Strait 3 miles north of Ship Island.
Woody Point. Admiralty Island, Chatham Strait, latitude $57^{\circ} 15'$.
Wrangell Island, south end. Ernest Sound.
Wright Sound. British Columbia, mainland, latitude $53^{\circ} 20'$.

The following table gives the data for the tags attached in southeastern Alaska during 1927:

TABLE 1.—Tags attached in southeastern Alaska, 1927

Experiment No.	Date	Serial Nos.	Species of fish tagged					Locality
			Red	Pink	Chum	Coho	King	
1	July 1	1-100	29	16	53		1	Parker Point, Chatham Strait.
2	July 9	101-400	32	107	158		2	Hourigan Point, Frederick Sound.
3	do	401-475	3	17	55			Carroll Island, Frederick Sound.
4	July 12	501-700	18	90	73		10	9 Marble Bluffs, Chatham Strait.
5	do	701-900	13	112	65		7	3 Parker Point, Chatham Strait.
6	July 14	901-1200	40	212	15		33	Inian Islands, Icy Strait.
7	July 16	1201-1700	101	362	8		27	Pleasant Island, Icy Strait.
8	do	1701-1900	10	186	3		1	Inian Islands, Icy Strait.
9	July 19	1901-2300	20	164	189		27	Hourigan Point, Frederick Sound.
10	July 20	2301-2800	30	347	98		21	3 Cape Bendel, Frederick Sound.
11	July 21	2801-3000	28	115	40		17	Point Hobart, Stephens Passage.
12	July 26	3001-3500	198	271	4		26	1 Point Colpoys, Sumner Strait.
13	July 30	3501-4000	185	306	6		2	Do.
14	do	4001-4300	29	164	82		24	Cape Decision, Sumner Strait.
15	Aug. 5	4301-4450	7	86	51		6	Dall Head, Gravina Island.
16	Aug. 6	4451-4700	4	240	1		5	Nelson Cove, Gravina Island.

RETURNS FROM EXPERIMENTS IN ICY STRAIT

RED SALMON

One hundred and fifty-one red salmon were tagged in Icy Strait during 1927, 41 of which were recaptured (27.1 per cent). The data are presented in Table 2.

TABLE 2.—Returns from red salmon tagged in Icy Strait, 1927

[In this and subsequent tables the figures in the columns headed "Days" represent the least and the greatest time that elapsed between tagging and reported recapture. The figures in the columns headed "Number" represent the number of fish recaptured in the given locality]

Locality of recapture	Locality and date of tagging						Total number recaptured
	Inian Islands				Pleasant Island July 16		
	July 14		July 16				
	Number	Days	Number	Days	Number	Days	
Icy Strait:							
No details	1	6					1
Dundas Bay	1	9					1
Gull Cove	1	5					1
Pleasant Island					1	6	1
Point Adolphus					1	7	1
East of Porpoise Islands	1	4			1	2	2
Hoonah					1	4	1
West of Rocky Island					1	4	1
North end of Chicagof Island					1	9	1
Lynn Canal:							
Douglas Island					1	4	1
Naked Island					1	9	1
Tee Harbor					1	10	1
Chatham Strait:							
Mansfield Point					1	7	1
South of Clear Point					1	6	1
North of Hawk Inlet					4	1-5	4
Hawk Inlet	2	5-6			1	1	3
Square Cove					2	4-5	2
South of Passage Point					2	4-5	2
Marble Bluffs					2	7-9	2
Basket Bay			1	7			2
Distant Point			1	15			1
Village Point					1	6	1
Near Kingsmill Point	1	23					1
Peril Strait: Hooniah Sound					1	19	1
Frederick Sound: Deepwater Point					1	8	1
Stephens Passage: Snettisham Inlet	1	10			3	4	4
Snipe Bay	1	42					1
West Coast Prince of Wales Island: Nichols Bay	1	37					1
Total	10		2		29		41
Percentage returned	40		20		18.1		27.1

Previous experiments had shown that the red-salmon runs entering Icy Strait early in the season (the latter part of June) contained fish bound for the Chilkat and Chilkoot Rivers. Later in the season (July 24 to 29) the Chilkat and Chilkoot fish appear to be gone, but Taku River fish appear in appreciable numbers. The Icy Strait experiments of 1927 were designed to test the distribution of the run at an intermediate period. The results are similar to those obtained from the experiments of July 24 to 29, 1926 (Rich and Suomela, p. 94), and indicate that the Chilkat and Chilkoot fish have passed through Icy Strait by the middle of July. There is, however, a relatively large migration south into Chatham Strait, and in this respect the experiments of 1927 resemble those of the latter part of June, 1926. (Rich, p. 119.)

PINK SALMON

Seven hundred and sixty pink salmon were tagged in Icy Strait during 1927, of which 287 were recaptured (37.7 per cent). The data are presented in Table 3.

TABLE 3.—Returns from pink salmon tagged in Icy Strait, 1927

Locality of recapture	Locality and date of tagging						Total number recaptured
	Inian Islands				Pleasant Island, July 16		
	July 14		July 16		Number	Days	
	Number	Days	Number	Days			
Cross Sound:							
George Island.....	1	2					1
North of Inian Pass.....	1	5					
Inian Pass.....			1	6			1
Dundas Bay.....	1	5					1
Icy Strait:							
No details.....	4	2-11	2	4	3	4-20	9
Gul Cove.....					2	3	2
Point Gustavus.....					2	3-5	2
East of Point Gustavus.....					1	3	1
Pleasant Island.....	7	1-5	3	2-9	8	2-4	18
Point Adolphus.....	6	2-30	3	4-7			9
Eagle Point.....	1	7	6	3	5	5-12	12
West of Rocky Island.....	2	3-5	2	4-6	2	4-5	6
East of Porpoise Islands.....					4	2-16	4
Ansley Point.....	4	6-11	2	4-5	3	4	9
North end of Chichagof Island.....					1	9	1
Hoonah.....			1	6			1
Port Frederick.....					2	21	2
Point Sophia.....					1	4	1
Point Augusta.....	1	6	3	4	6	4	10
Lynn Canal:							
South of Point Retreat.....					4	6-13	4
Tee Harbor.....	1	6			3	4	4
Douglas Island.....	1	6	1	4			2
Shelter Island.....					2	4	2
Shelter Cove.....					1	10	1
Chatham Strait:							
The Kittens.....	1	3			3	3-11	4
South of Clear Point.....			1	13	2	13-22	3
Mansfield Point.....	3	4	5	4-9	3	2-4	11
North of Hawk Inlet.....	7	2-17	3	3-9	9	1-10	19
Hawk Inlet.....	3	3-6	3	3-7	11	1-11	17
Point Marsden.....					2	1-11	2
Square Cove.....			4	4-7	5	4-5	9
Cube Point.....			1	9	3	4-7	4
Point Hepburn.....	1	8	1	4	4	6	6
False Bay.....					1	4	1
Gypsum.....			1	12	1	12	2
Fishery Point.....	1	28	1	28	2	28	4
Marble Bluffs.....			4	7-10	4	7-9	8
South of Passage Point.....	2	7	4	4-22	9	4-15	15
Basket Bay.....	1	8	1	15	1	7	3
Peninsular Point.....	1	6			1	4	2
Woody Point.....			2	4-6	1	6	3
Hood Bay.....					1	3	1
Distant Point.....	2	8-9			2	7-15	4
Village Point.....	2	6-9	3	4-7	6	4-8	11
Point Caution.....	4	5-7	3	11-13			7
Moonshine Point.....			1	12	1	2	2
Rocky Bay.....	3	6-25					3
Kingsmill Point.....	2	6-10			2	6-20	4

TABLE 3.—Returns from pink salmon tagged in Icy Strait, 1927—Continued

Locality of recapture	Locality and date of tagging						Total number recaptured
	Inian Islands				Pleasant Island, July 16		
	July 14		July 16				
	Number	Days	Number	Days	Number	Days	
Peril Strait:							
No details.....			1	13	2	13-19	3
Rodman Bay.....	1	15					1
Frederick Sound:							
Carroll Island.....			1	6			1
Deepwater Point.....					2	8-12	2
Pybus Bay.....			1	23			1
Cape Bendel.....			1	19			1
Fanshaw Bay.....					1	14	1
Stephens Passage:							
Point Hobart.....					1	10	1
Windham Bay.....			1	17	2	9-16	3
Seymour Canal.....					3	13-17	3
Mole Harbor.....					1	5	1
Shoal Point.....			1	12	2	12	3
Snettisham Inlet.....					2	4-19	2
Limestone Inlet.....			1	11			1
Taku Inlet.....	1	15			1	13	2
Taku River.....	2	6-14	1	6	1	7	4
Groundhog Bay.....			3	4-5	1	5	4
Slocum Arm.....	1	12					1
Salisbury Sound.....					1	8	1
Karheen.....					1	35	1
Total.....	68		73		146		287
Percentage returned.....	31.6		39.2		40.3		37.7

The results are, in every important respect, the same as those secured from the previous experiments, indicating that the main route of migration is south into Chatham Strait and Frederick Sound.

CHUM SALMON

Twenty-six chum salmon were tagged in Icy Strait during 1927, five of which were recaptured (19.2 per cent). One was taken in Icy Strait, two in Chatham Strait, and two in Stephens Passage. These results, although few, agree with the earlier experiments.

COHO SALMON

Sixty-one coho salmon were tagged in Icy Strait during 1927, 11 of which were recaptured (18 per cent). The data are presented in Table 4. The results again corroborate the earlier experiments, showing the chief route of migration to be into Chatham Strait. It is also to be noted that the relatively slow migration of cohos is again shown clearly.

TABLE 4.—Returns from coho salmon tagged in Icy Strait in 1927

Locality of recapture	Locality and date of tagging				Total number recaptured	Locality of recapture	Locality and date of tagging				Total number recaptured
	Inian Islands, July 14		Pleasant Island, July 16				Inian Islands, July 14		Pleasant Island, July 16		
	Number	Days	Number	Days			Number	Days	Number	Days	
Cross Sound: Inian Islands.....	1	60			1	Chatham Strait—Continued. Wilson Cove..... Cosmos Cove..... Baranof Island: Snipe Bay..... Total..... Percentage returned.....					
Itallo River, Yakutat.....	1	47			1						
Chatham Strait:											
Mansfield Point.....			1	4	1				1	26	
Point Cube.....			1	13	1				1	25	
Marble Bluffs.....			1	19	1				1	42	
Village Point.....			2	4-7	2						
Point Caution.....			1	29	1						
							2		9		11
							6		33.3		18

RETURNS FROM EXPERIMENTS IN CHATHAM STRAIT

RED SALMON

Sixty red salmon were tagged in Chatham Strait during 1927, 15 of which were recaptured (25 per cent). The data are presented in Table 5 and are very similar to those secured in 1926: Both series indicate migrations both north and south from the point of tagging. In the experiments of 1924 and 1925 red salmon were tagged in Chatham Strait south of Frederick Sound. None of these fish were taken in Chatham Strait north of Frederick Sound, and yet both the experiments of 1926 and 1927 indicate a migration north from the region of Parker Point and Marble Bluffs. These facts may indicate that a considerable run of salmon enters southeastern Alaska through Peril Strait.

TABLE 5.—Returns from red salmon tagged in Chatham Strait, 1927

Locality of recapture	Locality and date of tagging						Total number re-captured
	Parker Point				Marble Bluffs, July 12		
	July 1		July 12				
	Number	Days	Number	Days	Number	Days	
Chatham Strait, north of Parker Point:							
South of Passage Point.....			1	3			1
Fishery Point.....					1	3	1
Hawk Inlet.....	1	2					1
North of Hawk Inlet.....			2	2-5	1	2	3
Icy Strait.....					1	5	1
Lynn Canal: Point Retreat.....	1	12					1
Chatham Strait, south of Parker Point:							
Basket Bay.....	1	7			1	12	2
Village Point.....					1	10	1
Stephens passage:							
Snettisham Inlet.....			1	18			1
Taku Inlet.....	1	26					1
Taku River.....					1		1
Stikine River: North Arm ¹					1	(?)	1
Total.....	4		4		7		15
Percentage returned.....	13.7		30.7		38.8		25

¹ Reported captured before date of tagging.

PINK SALMON

Two hundred and eighteen pink salmon were tagged in Chatham Strait during 1927, 70 of which were recaptured (32.1 per cent). The data are presented in Table 6. They corroborate the data secured in 1926 but add nothing new.

TABLE 6.—Returns from pink salmon tagged in Chatham Strait, 1927

Locality of recapture	Locality and date of tagging						Total number re-captured
	Parker Point				Marble Bluffs, July 12		
	July 1		July 12				
	Number	Days	Number	Days	Number	Days	
Chatham Strait, north of Parker Point:							
Peninsular Point.....			1	3			1
Marble Bluffs.....			2	1-3	7	1-16	9
Fishery Point.....			1	30	4	3	5
Cube Point.....					1	4	1
Point Hepburn.....			1	4	2	2	3
Hawk Inlet.....	1	13	2	3	2	3	5
North of Hawk Inlet.....	1	4	1	2	1	4	3
Icy Strait:							
West of Rocky Island.....			2	5	1	8	3
East of Porpoise Island.....					1	6	1
Point Adolphus.....					1	10	1
Lynn Canal:							
The Kittens.....			1	5			1
Naked Island.....					1	1	1
Douglas Island.....	1	7	1	8			2
Chatham Strait, south of Parker Point:							
Parker Point.....			7	3-16			7
Basket Bay.....			3	3-4			3
Morris Reef.....			1	3			1
Distant Point.....			1	22			1
Woody Point.....			1	9			1
Point Caution.....			5	2	1	16	6
Moonshine Point.....			1	2			1
Cosmos Cove.....			1	1			1
Kingsmill Point.....			2	8-34			2
Frederick Sound:							
Hourigan Point.....					1	9	1
Point Macartney.....			1	2			1
Stephens Passage:							
Point Hobart.....			1	10			1
Seymour Canal.....			4	8-17			4
Mole Harbor.....			2	9-14			2
Snettisham Inlet.....			1	17			1
Taku Inlet.....					1	8	1
Total.....	3		43		24		70
Percentage returned.....	18.7		38.3		26.6		32.1

CHUM SALMON

One hundred and ninety-one chum salmon were tagged in Chatham Strait during 1927, 64 of which were recaptured (33.5 per cent). The data are presented in Table 7.

TABLE 7.—Returns from chum salmon tagged in Chatham Strait, 1927

Locality of recapture	Locality and date of tagging						Total number re-captured
	Parker Point				Marble Bluffs, July 12		
	July 1		July 12				
	Number	Days	Number	Days	Number	Days	
Chatham Strait, north of Parker Point:							
Marble Bluffs.....			2	2-16	4	1-16	6
Basket Bay.....	3	1-14	3	8-14	4	3-14	10
South of Passage Point.....	1	14					1
Fishery Point.....			1	3			1
Gypsum.....					1	13	1
Cube Point.....	1	13					1
Hawk Inlet.....	2	4					2
Point Augusta.....					1	3	1
Icy Strait:							
No details.....					1	24	1
Ansley Point.....			1	4			1
Point Adolphus.....			2	3-10	1	6	3

TABLE 7.—Returns from chum salmon tagged in Chatham Strait, 1927—Continued

Locality of recapture	Locality and date of tagging						Total number re-captured
	Parker Point				Marble Bluffs, July 12		
	July 1		July 12				
	Number	Days	Number	Days	Number	Days	
Lynn Canal:							
Naked Island.....			1	3	1	4	2
Douglas Island.....	3	7-12					3
Chatham Strait, south of Parker Point:							
Parker Point.....			1	14	1	3	2
Hood Bay.....			3	6-9	2	6	5
Woody Point.....			1	9			1
Distant Point.....					2	15-22	2
Rocky Point.....					1	2	1
Point Caution.....	2	8-20	1	2	1	4	4
Kingsmill Point.....	1	5			1	7	2
Peril Strait.....					1	17	1
Salisbury Sound.....					1	4	1
Frederick Sound:							
Carroll Island.....			1	24			1
Point Brightman.....					2	8-13	2
Hourigan Point.....					1	9	1
Cape Fanshaw.....			1	10			1
Stephens Passage:							
Port Houghton.....	1	6					1
Seymour Canal.....	2	10-34					2
Mole Harbor.....					1	9	1
Windfall Harbor.....					1	12	1
Dry Bay.....	1	20					1
Taku River.....					1	7	1
Total.....	17		18		29		64
Percentage returned.....	32.1		27.6		39.7		33.5

Very few chums were tagged in previous experiments at this point, so that the information contained in the table is virtually all new. The distribution of this species is, however, very similar to that of the pinks. Two important routes of migration are shown. The main migration followed a northerly route through Chatham Strait to its junction with Icy Strait, from whence four returns were reported. The southerly migration showed a tendency to follow the Admiralty Island shore of Chatham Strait to Frederick Sound, where five tagged fish were recaptured. One individual crossed Frederick Sound and was recaptured at Hourigan Point on the Kuiu Island shore. Seven returns were reported from Stephens Passage, of which four were recaptured in Seymour Canal. One individual was reported from Peril Strait and another from Salisbury Sound.

COHO SALMON

Seventeen coho salmon were tagged in Chatham Strait at Marble Bluffs and Parker Point during 1927, of which three were recaptured (17.6 per cent). One each was reported from the following localities: North of Hawk Inlet, Chatham Strait, 2 days; Marble Bluffs, Chatham Strait, 3 days; Point Gardner, Chatham Strait, 56 days.

KING SALMON

Thirteen king salmon were tagged in Chatham Strait at Marble Bluffs and Parker Point during 1927, two of which were recaptured (15.3 per cent), one each from the following localities: Wilson Cove, Chatham Strait, 29 days; Point Adolphus, Icy Strait, 10 days.

RETURNS FROM EXPERIMENTS IN FREDERICK SOUND

Four tagging experiments were made here in 1927, the greater number of the tagged fish being pinks and chums. Two hundred and ninety-nine fish were tagged at Hourigan Point on July 1, 75 at Carroll Island on July 9, 400 at Hourigan Point on July 19, and 499 at Cape Bendel on July 20. Although there are some distinct differences in the results obtained from these experiments, the general similarities are sufficient to warrant considering them together.

RED SALMON

Only 14 fish of this species were recaptured, and no important additions were made to our previous knowledge of their migration. Four of those tagged near the western end of Frederick Sound were taken later in Chatham Strait. One was taken in Clarence Strait, one in the Stikine River at Grand Rapids, and the other eight in Frederick Sound and Stephens Passage.

PINK SALMON

Six hundred and thirty-five pink salmon were tagged in Frederick Sound and 307 (48.4 per cent) were recaptured later. The data are presented in Table 8.

TABLE 8.—Returns from pink salmon tagged in Frederick Sound, 1927

Locality of recapture	Locality and date of tagging								Total number recaptured
	Hourigan Point				Carroll Island		Cape Bendel		
	July 9		July 19		July 9		July 20		
	Number	Days	Number	Days	Number	Days	Number	Days	
Frederick Sound:									
Hourigan Point			5	2-20			2	1-10	7
Security Bay							1	10	1
Saginaw Bay			2	9-22			1	8	3
Carroll Island			1	1					1
Herring Bay			2	10			4	7-9	0
Point Highland	1	7	4	18			4	1-19	9
Deepwater Point	1	32	10	5			19	1-21	30
Point Macartney	4	5-7	5	2-9			5	1-17	14
Cape Bendel			4	3-6			8	2-16	12
Little Pybus Bay	1	20	1	10			3	9-18	5
Pybus Bay	1	6	1	6			4	2-37	6
Point Pybus			1	10			3	4-5	4
Keku Strait							1	21	1
Cape Fanshaw	3	3	8	2-18			24	1-15	35
Fanshaw Bay			3	4-9			10	2-8	13
Dry Bay			2	18			2	5-14	4
Point Vandeput			1	7					1
Cape Strait							1	21	1
Thomas Bay							1	1	1
Chatham Strait, north of Frederick Sound:									
No details							1	19	1
Kasnyku Bay			1	17					1
Rocky Bay							2	8-23	2
Peril Strait	1	20					2	7-15	3
Point Caution	1	3	1	5			1	8	3
Cosmos Cove			1	5			1	9	2
Distant Point							2	13	2
Hood Bay	1	10							1
Basket Bay			1	9					1
Marble Bluffs	1	4					1	16	2
Cube Point							1	5	1
Point Marsden				19			1		1
Hawk Inlet			2	3-4					2
Funter Bay	1	11							1
Icy Strait: West of Rocky Island							1	6	1
Chatham Strait, south of Frederick Sound:									
Kingsmill Point	11	2	2	4-8					13
South of Kingsmill Point			11	1-20			2	2-4	13
North of Washington Bay			4	1-9			3	5-13	
Tebenkof Bay	1	5							

TABLE 8.—Returns from pink salmon tagged in Frederick Sound, 1927—Continued

Locality of recapture	Locality and date of tagging								Total number recaptured
	Hourigan Point				Carroll Island July 9		Cape Bendel July 20		
	July 9		July 19		Number	Days	Number	Days	
	Number	Days	Number	Days					
Stephens Passage:									
Port Houghton.....	2	13-30	4	5-23			5	2-15	11
Point Hobart.....			1	10			1	5	2
Hobart Bay.....							2	9-10	2
Windham Bay.....			3	5-19	1	6	13	4-17	17
Seymour Canal.....	7	7-13	7	1-18	2	11-20	20	1-22	36
Mole Harbor.....	2	10-13			1	10	4	6	7
Windfall Harbor.....	2	11-18					3	7	5
Pleasant Bay.....	1	19					2	3-8	3
Limestone Inlet.....	1	4	2	15			1	14	4
Taku River.....							1	(?)	1
Shelter Cove.....							1	5	1
Salisbury Sound.....			1	5			1	4	2
Clarence Strait:									
Snow Passage.....							1	14	1
McNamara Point.....	1	20							1
Ernest Sound: Watkins Point.....							1	11	1
West Coast Prince of Wales Island: Karheen.....							1	31	1
Total.....	44		92		4		167		307
Percentage returned.....	41.1		56.0		23.5		48.2		48.4

These data fully confirm the results of previous experiments in showing that the pinks of Frederick Sound are distributed chiefly among the streams of that locality and Stephens Passage. Virtually every experiment, however, has shown a slight movement out of the sound and both north and south in Chatham Strait. No new facts of importance were brought out by the tagging experiments of 1927.

CHUM SALMON

Five hundred chum salmon were tagged in Frederick Sound during 1927, of which 117 were recaptured later. The data are presented in Table 9.

TABLE 9.—Returns from chum salmon tagged in Frederick Sound, 1927

Locality of recapture	Locality and date of tagging								Total number recaptured
	Hourigan Point				Carroll Inlet, July 9		Cape Bendel July 20		
	July 9		July 19		Number	Days	Number	Days	
	Number	Days	Number	Days					
Frederick Sound:									
Hourigan Point.....			3	1-11					3
Security Bay.....	4	10-26	11	4-15			1	10	16
Herring Bay.....			2	10			1	6	3
Deepwater Point.....	1	15	3	2-16	1	15	1	(?)	6
Big Johns Bay.....	3	19-21	4	10-23			1	11	8
Kaku Strait.....	2	18-22	4	12-25			1	21	7
Kake Harbor.....			1	10					1
Portage Creek, Kake.....			1	16					1
Point Macartney.....			1	2			2	4-9	3
Cape Bendel:					1	21			1
Little Pybus Bay.....	1	27					2	9	3
Pybus Bay.....			1	22					1
Fanshaw Bay.....			1	9					1
Cape Fanshaw.....			3	13-21			1	9	3
Chatham Strait, north of Frederick Sound:									
Point Gardner.....					1	33			1
Point Caution.....	2	20	1	12			1	17	4
Cosmos Cove.....			1	7					1
Distant Point.....			3	3-4					3

TABLE 9.—Returns from chum salmon tagged in Frederick Sound, 1927—Continued

Locality of recapture	Locality and date of tagging								Total number recaptured
	Hourigan Point				Carroll Inlet, July 9		Cape Bendel, July 20		
	July 9		July 19		Number	Days	Number	Days	
	Number	Days	Number	Days					
Chatham Strait, north of Frederick Sound—Con.									
Hood Bay			1	7					1
Basket Bay							1	11	1
Hawk Inlet							1	6	1
Chatham Strait, south of Frederick Sound:									
Kingsmill Point	5	2-10			2	2-9			7
South of Kingsmill Point			4	1-32					4
North of Washington Bay			3	9-10			1	(?)	4
Bay of Pillars			3	8-24					3
Tebenkof Bay	1	13	6	3-13			1	7	8
Stephens Passage:									
Port Houghton	1	26							1
Gambier Bay			1	10					1
Seymour Canal	4	11-16			1	33	2	8-13	7
Mole Harbor					1	20			1
Windfall Harbor	1	18					1	7	2
Pleasant Bay			1	9					1
Limestone Inlet							1	10	1
Windham Bay			1	7				10	2
Shelter Cove			1	6					1
Sumner Strait:									
Calder Bay					1	33			1
Karheen			1	31					1
Stikine River	1	25							1
Point McNamara, Clarence Strait			1	15					1
Breakwater, North, Revillagigedo Channel	1	17							1
Total	27		62		8		20		117
Percentage returned	17.1		32.8		14.5		20.4		23.4

These data provide new information relative to the migration of chum salmon taken in Frederick Sound, as comparatively few chums had been tagged here in the previous experiments. The main migration of chum salmon tagged at Hourigan Point and Carroll Island traversed Frederick Sound to its junction with Stephens Passage, thence northerly, where 12 returns are shown from various points in Stephens Passage. Nine returns are reported from Chatham Strait north of Kingsmill Point and 24 from Chatham Strait south of that point. Two returns are shown from Sumner Strait and one from Stikine River. One was reported at McNamara Point, Clarence Strait, and another individual was recaptured at North Breakwater in Revillagigedo Channel.

The returns from the chums tagged at Cape Bendel, Frederick Sound, show two distinct migrations. The main migration followed through Frederick Sound, particularly along the Admiralty Island shore, to its junction with Chatham Strait, from whence three of the fish took a northerly route extending as far north in Chatham Strait as Hawk Inlet. Two followed the Kuiu Island shore of Chatham Strait and were recaptured north of Washington Bay and in Tebenkof Bay, respectively. The other important migration was into Stephens Passage, from which place one-fourth of the returns were secured.

COHOS

Fifty cohos were tagged and nine were recaptured later. Five were taken in Frederick Sound and Stephens Passage; 2 in Chatham Strait; 1 in Clarence Strait; and 1 in Selwyn Inlet, Queen Charlotte Islands, British Columbia.

RETURNS FROM EXPERIMENTS AT POINT HOBART, STEPHENS PASSAGE

Two hundred salmon were tagged at Point Hobart, Stephens Passage, on July 21. Of this number 28 were reds, 115 pinks, 40 chums, and 17 cohos. None of the cohos were returned. Five red salmon were recaptured (17.8 per cent). Two of these were taken at Snettisham, Stephens Passage, one in 2 and the other in 9 days; two others were taken in Herring Bay, Frederick Sound; one in 2 and the other in 8 days; and one was reported taken in Icy Strait after an interval of 7 days. Seven chums were recaptured (17.5 per cent). Three were taken in Stephens Passage, three in Frederick Sound, and one at Point Ellis, Chatham Strait.

PINK SALMON

The returns from pinks tagged at Point Hobart, Stephens Passage, are shown in Table 10 and indicate two distinct migrations. The heaviest of these was in a northerly direction into the waters of Stephens Passage. More than half of the returns from this migration were from Seymour Canal. The second and lighter migration was through Frederick Sound, both south and west from Point Hobart. One individual was recaptured in Basket Bay, Chatham Strait. This is an interesting addition to our knowledge of the salmon migrations in southeastern Alaska, as no experiments had been conducted previously in the southern part of Stephens Passage. It is evident that most of the fish taken in this region belong in Stephens Passage and doubtless have entered through Frederick Sound. The fish that went westward from Point Hobart may possibly have come down Stephens Passage from the north, but it seems much more probable that this movement represents more or less chance wandering of fish that are still feeding.

TABLE 10.—Returns from pinks tagged at Point Hobart, July 21—115 tagged, 42 returns (36.5 per cent)

Locality of recapture	Number	Days	Locality of recapture	Number	Days
Stephens Passage:			Frederick Sound:		
Point Hobart.....	2	1-3	Fanshaw Bay.....	1	2
Port Houghton.....	2	3-14	Cape Fanshaw.....	4	3-8
Hobart Bay.....	1	3	Point Pybus.....	1	5
Windham Bay.....	10	3-7	Pybus Bay.....	4	4
Mole Harbor.....	1	5	Deepwater Point.....	2	3
Pleasant Bay.....	1	2	Point Macartney.....	1	8
Seymour Canal.....	6	1-20	Saginaw Bay.....	1	7
Twin Point.....	1	3	Chatham Strait: Basket Bay.....	1	7
Snettisham.....	1	5			
Shoal Point.....	1	11			
Limestone Inlet.....	1	17			

RETURNS FROM EXPERIMENTS AT POINT COLPOYS, SUMNER STRAIT

RED SALMON

Three hundred and eighty-three salmon were tagged at Point Colpoys, Sumner Strait, on July 26 and 30, 118 of which were recaptured (30.8 per cent). The data are presented in Table 11. They support in detail the conclusions reached through the previous experiments but add nothing new to our knowledge of the migrations in this region.

TABLE 11.—Returns from red salmon tagged at Point Colpoys, 1927

Locality of recapture	Locality (Point Colpoys) and date of tagging				Total number recaptured	Locality of recapture	Locality (Point Colpoys) and date of tagging				Total number recaptured
	July 26		July 30				July 26		July 30		
	Number	Days	Number	Days			Number	Days	Number	Days	
Sumner Strait:						Clarence Strait, South of Ernest Sound—Continued.					
Point Colpoys.....	9	6-25	3	4	12	Wolf Creek.....	1	5			1
Red Bay.....	5	3			5	Ship Island.....	2	8-10	2	6	4
Point Baker.....			1	6	1	Ship Harbor.....	1	10			1
Stikine Flats.....	1	(1)			1	False Island.....			1	5	1
Frederick Sound: Boulder Point.....	1	10			1	Caamano Point.....			2	4-10	2
Clarence Strait, north of Ernest Sound:						Grindall Point.....	1	10			1
Snow Passage.....	1	15			1	Clover Passage.....	1	8			1
Point Nesbitt.....	5	3-8	2	7-14	7	Guard Islands.....			1	14	1
West entrance, Stikine Strait.....			1	4	1	Gravina Island.....	1	11	1	10	2
Etolin Island.....			1	5	1	Dall Head.....	1	6			1
Point Harrington.....	1	3			1	Cedar Point.....			1	5	1
Marsh Island.....	1	2			1	Driest Point.....			1	13	1
Kashevarof Passage.....	1	3			1	Point Davison.....	2	4-12	1	6	3
Coffman Island.....			3	3-5	3	Hotspur Island.....			2	8-13	2
Whale Passage.....	3	2	3	3	6	Point Percy.....			3	4-7	3
Screen Islands.....	2	3-4			2	Sealed Passage.....	1	8	1	6	2
Eagle Creek.....	3	4-14	1	20	4	Ingraham Bay.....			1	10	1
Ratz Point.....	2	3-12	3	4	5	South Kendrick Bay.....	1	4			1
Narrow Point.....	1	5	5	4-8	6	Cape Chacon.....			1	12	1
Ernest Sound:						Cordova Bay: Point Marsh.....	1	23			1
Union Bay.....	1	5	1	15	2	Behm Canal: Yes Bay.....			1	55	1
Eton Point.....			1	8	1	Revillagigedo Channel:					
Watkins Point.....	1	5			1	Kirk Point.....	1	14			1
Seward Passage.....			1	8	1	Boat Harbor.....			2	5-10	2
South end Wrangell Island.....	1	8			1	Kanagunut Island.....			1	3	1
Bradfield Canal: Eagle River.....	1	4			1	British Columbia:					
Clarence Strait, south of Ernest Sound:						Portland Inlet.....	1	9			1
Lemesurier Point.....			1	11	1	Mouth of Skeena River.....	1	8	1	2	2
Meyers Chuck.....			1	3	1	Kitchen Island.....	1	6			1
Tolstoi Bay.....	2	4			2	Smith Island.....	1	6			1
						Skeena or Nass Rivers ¹			7	(?)	7
						Total.....	60		58		118
						Percentage returned.....	30.3		31.3		30.8

¹ Reported captured before date of tagging.² 7 tags recovered near Skeena River, Nass River, and Lowe Inlet, British Columbia, July and August.

PINK SALMON

Five hundred and seventy-seven pink salmon were tagged at Point Colpoys, Sumner Strait, during 1927, 232 of which were recaptured (40.2 per cent). The data presented in Table 12 show the same general distribution of pink salmon from Sumner Strait as was shown by the previous experiments. It is interesting to note, however, that none of the fish tagged in 1927 were recaptured on the west coast of Prince of Wales Island. This agrees with the experiments of 1926, but both differ in this respect from the experiments of 1924 and 1925, which were made at Ruins Point. It is evident that the fish that enter the strait as far as Point Colpoys are pursuing a definite migration, while those as far out as Ruins Point may or may not be definitely entering Sumner Strait.

TABLE 12.—Returns from pink salmon tagged at Point Colpoys, 1927

Locality of recapture	Locality (Point Colpoys) and date of tagging				Total number recaptured	Locality of recapture	Locality (Point Colpoys) and date of tagging				Total number recaptured
	July 26		July 30				July 26		July 30		
	Number	Days	Number	Days			Number	Days	Number	Days	
Sumner Strait:						Clarence Strait, South of Ernest Sound—Continued.					
Point Colpoys.....	3	6-13	5	2-6	8	Wolf Creek	2	5	1	7	3
Red Bay.....	1	3			1	2 miles north of Ship Island.....			1	10	1
Point St. John.....			1	1	1	Tolstoi Bay.....	1	4			1
Cape Decision.....			1	5	1	Ship Island.....			5	4-10	5
Barrier Islands.....	1	3			1	False Island.....	2	7-9	4	6-10	6
Frederick Sound: Hobart Bay.....	1	4			1	Caamano Point.....	3	8	4	4-8	7
Clarence Strait:						Behm Canal:					
McNamara Point.....			2	4-6	2	Betton Island.....	1	15	1	11	2
Snow Passage.....	1	15	2	6-11	3	Point Higgins.....			1	7	1
Point Nesbitt.....	4	3-6	2	8-9	6	Helm Bay.....			1	6	1
West entrance to Stikine Strait.....	3	10-17			3	Traitors Cove.....			2	7-12	2
Point Harrington.....	1	3			1	Clarence Strait south of Behm Canal:					
Screen Islands.....	4	3-9	1	4	5	Island Point.....			1	14	1
Point Barnes.....	2	3	1	7	3	Skin Island.....			1	10	1
Marsh Island.....	1	2			1	Niant Cove.....	1	12			1
Abraham Islands.....	2	7-9			2	Nelson Cove.....	1	12			1
Whale Passage.....	3	2-3	2	3	5	Gravina Island.....	1	17	3	4-7	4
Coffman Island.....			2	3-5	2	Dall Head.....			3	8	3
Eagle Creek.....	2	3-14			2	Cedar Point.....			1	5	1
Benita Passage.....			1	4	1	Point Davison.....			1	6	1
Rocky Bay.....			1	3	1	Hotspur Island.....			1	4	1
Ratz Point.....			4	4-18	4	Vegas Islands.....	2	16	1	12	3
Gull Point.....	1	7			1	Sealed Passage.....	2	8			2
Onslow Island.....	3	7-12	1	3	4	Duke Island.....			1	6	1
Narrow Point.....	2	5	1	5	3	Cape Chacon.....			2	12	2
Ernest Sound:						Nichols Passage: Bostwick Inlet.....			3	10-16	3
Union Bay.....	1	14	4	5	5	Revillagigedo Channel:					
Union Point.....	6	1-5	8	3-10	14	Crab Bay.....			1	13	1
Vixen Inlet.....	1	7	1	3	2	Point Sykes.....			1	10	1
Eaton Point.....	7	5-12	7	3-19	14	Breakwater, south.....	1	10			1
Watkins Point.....	4	5-10	6	4-14	10	Kah Shakes Point.....	1	4			1
West side of Deer Island.....	1	8			1	Foggy Bay.....			1	6	1
Seward Passage.....	6	7-12	6	3-8	12	Boat Harbor.....	2	12	1	5	3
South end of Wrangell Island.....	14	5-8	6	5-10	20	Cape Fox.....	1	9			1
Point Warde.....	1	8	3	4-7	4	British Columbia:					
Anan Creek.....	4	4-15	1	6	5	Nass River.....			1	8	1
Clarence Strait, south of Ernest Sound:						Wright Sound.....			1	43	1
Lemesurier Point.....			1	5	1						
Meyers Chuck.....			6	2-11	6						
Misery Island.....	5	4			5						
Three Islands.....	2	4-7	3	3-13	5						
						Total.....	108		123		231
						Percentage returned.....	39.8		40.5		40.2

COHO SALMON

Twenty-eight coho salmon were tagged at Point Colpoys, Sumner Strait, during 1927, six of which were recaptured (21.4 per cent). One was taken at Point Colpoys after 18 days, and the others were taken in various localities in Clarence Strait after 8 to 17 days.

RETURNS FROM EXPERIMENTS AT CAPE DECISION, SUMNER STRAIT

Two hundred and ninety-nine salmon were tagged at Cape Decision, Sumner Strait, on July 30. Of this number 29 were reds, 164 pinks, 82 chums, and 24 cohos.

RED SALMON

Of the 29 reds tagged at Cape Decision on July 30 only 4 were recaptured. One was taken in each of the following localities: Barrier Islands, Sumner Strait, 12 days; Tebenkof Bay, Chatham Strait, 11 days. Two were taken in or near the Skeena and Nass Rivers and Lowe Inlet, British Columbia, during July and August, but no definite dates or locations were recorded.

PINK SALMON

The returns from pinks tagged at Cape Decision, Sumner Strait, are presented in Table 13. These data would indicate two important migrations. The main migration traversed the waters of Sumner Strait to its junction with Clarence Strait, thence southerly in Clarence Strait. Two individuals of this migration were recaptured in Ernest Sound. One return is noted from Skeena River, British Columbia. The second and minor migration was northerly into Chatham Strait, whence 16 returns are reported.

TABLE 13.—Returns from pinks tagged at Cape Decision, July 30—164 tagged, 41 returns (25 per cent)

Locality of recapture	Number	Days	Locality of recapture	Number	Days
Sumner Strait:			Frederick Sound: Cape Fanshaw.....	1	2
Cape Decision.....	2	4-8	Clarence Strait:		
Calder Bay.....	2	13	Snow Passage.....	1	6
Rocky Cove.....	1	11	Point Nesbitt.....	1	12
Cape Pole.....	1	7	Blaske Island.....	1	8
Ruins Point.....	1	6	Narrow Point.....	1	11
Point Colpoys.....	5	4-13	Ernest Sound:		
Totem Bay.....	1	12	Seward Passage.....	1	8
Keku Strait.....	2	6-9	South end of Wrangell Island.....	1	14
Chatham Strait:			Clarence Strait, south of Ernest Sound:		
Gedney Harbor.....	1	14	Meyers Chuck.....	1	8
Port Herbert.....	1	14	Wolf Creek.....	1	6
Tebenkof Bay.....	2	11-13	Turn Point ¹	1	10
North of Washington Bay.....	3	4	British Columbia: Skeena River.....	1	21
South of Kingsmill Point.....	5	4-9			
Red Bluff Bay.....	1	5			
Basket Bay.....	1	6			
North of Hawk Inlet.....	1	8			

¹ Location doubtful.

These results differ materially from those secured from the experiments of 1924 and 1925 at Ruins Point, although this locality is just across Sumner Strait from Cape Decision. In the experiments at Ruins Point a large number of pink salmon went to various localities along the west coast of Prince of Wales Island, and comparatively few went north into Chatham Strait. The conditions were just reversed in this experiment at Cape Decision. None of the pinks tagged there were taken along the west coast of Prince of Wales Island, and a large percentage went north in Chatham Strait. These differences may, of course, be due to chance, but it seems more likely that they are indicative of a distinct difference in the composition of the schools from which the tagged fish were taken. It seems unlikely, however, that such marked differences would be found between the fish at two points so close together at any one time, and we are inclined to ascribe these differences to differences in the runs of 1924 and 1925 as compared with that of 1927. Since the fishery was virtually a failure on the west coast of Prince of Wales Island in 1927, it is not particularly surprising that few fish bound for this region were found among the catches at Cape Decision.

CHUM SALMON

The chums tagged at Cape Decision and again captured followed a northerly route into Chatham Strait without exception. Three individuals were recaptured at Cape Decision 5 to 15 days from the date of tagging. One entered Frederick Sound and was recaptured at Security Bay; four were taken along the Chatham Strait shore of Kuiu Island; and one was recaptured at Point Hepburn on Admiralty Island.

COHO SALMON

Twenty-four coho salmon were tagged at Cape Decision on July 30. Only one was recaptured, and this was taken near Washington Bay, Chatham Strait, in four days.

RETURNS FROM EXPERIMENTS IN CLARENCE STRAIT

RED SALMON

Eleven red salmon were tagged at Gravina Island during 1927, six of which were recaptured (54.5 per cent). Two were taken in Clarence Strait, one in Revillagigedo Channel, and three in Behm Canal. One of those taken in Behm Canal was found at the Yes Bay hatchery of the Bureau of Fisheries during spawning operations.

PINK SALMON

Three hundred and twenty-six pink salmon were tagged at Gravina Island during 1927, 77 of which were recaptured (23.6 per cent). The data are presented in Table 14.

TABLE 14.—Returns from pink salmon tagged at Gravina Island, 1927

Locality of recapture	Locality and date of tagging				Total number recaptured	Locality of recapture	Locality and date of tagging				Total number recaptured
	Dall Head, Aug. 5		Nelson Cove, Aug. 6				Dall Head, Aug. 5		Nelson Cove, Aug. 6		
	Number	Days	Number	Days			Number	Days	Number	Days	
Clarence Strait, north of Dall Head:						Clarence Strait north of Behm Canal—Continued.					
Dall Head			2	1-4	2	Onslow Island			2	4-9	2
Nelson Cove	1	2	5	1-7	6	Ratz Point			1	11	1
Gravina Island	3	8-9	1	3	4	Ernest Sound:					
East coast, Prince of Wales Island			1	5	1	Union Bay			2	3-8	2
Guard Islands			3	7	3	Eaton Point	1	11	6	3-12	7
Grindall Point			1	8	1	South end of Wrangell Island			1	7	1
Behm Canal:						Clarence Strait, south of Dall Head:					
Betton Island			1	4	1	Polk Island			1	8	1
Bond Bay			1	4	1	Hotspur Island			1	5	1
Smugglers Cove			1	2	1	Cedar Point	1	5			1
Helm Bay	1	6	7	2-6	8	Percy Islands	1	3			1
Escape Point			1	8	1	Duke Island	1	5			1
Spacious Bay			1	3	1	South Kendrick Bay			1	6	1
Bluff Point			1	2	1	Cape Chacon	1	6			1
Clarence Strait north of Behm Canal:						Nichols Passage: Bostwick Inlet	2	4-10			2
Caamano Point	2	3-6	2	3	4	Revillagigedo Channel:					
NiBlack Point	1	3			3	Slate Islands	1	8	1	7	2
Ship Island	3	1-4			1	Foggy Bay			1	7	1
Faise Island			1	8	1	Boat Harbor	1	11	1	3	2
2 miles north of Ship Island	2	4	2	3	4	Behm Canal, east end: Point Nelson	1	3			1
Three Islands	1	4	1	3	2						
Meyers Chuck			1	4	1						
Meyers Island			1	4	1						
Lemesurier Point			1	4	1						
						Total	24		53		77
						Percentage returned	27.9		22		23.6

The returns indicate two lines of migration—the main one northerly into Clarence Strait, traversing this body of water to its junction with Behm Canal and also to its junction with Ernest Sound, and a minor one in a southerly direction from the point of tagging. Part of this latter migration crossed Clarence Strait to the Prince of Wales Island shore, where three fish were recaptured. The majority, however, followed the Gravina Island shore and then took an easterly course, scattering to various points

in Felice Strait and Revillagigedo Channel. The time of travel is noticeably short, the minimum being 1 day and the maximum 12 days.

CHUM SALMON

Fifty-two chum salmon were tagged at Gravina Island during 1927. Only three were recaptured (5.7 per cent), one each from the following localities: Seal Cove, Gravina Island, 5 days; Vegas Islands, Felice Strait, 6 days; Clover Passage, Behm Canal, 1 day.

COHO SALMON

Eleven coho salmon were tagged at Gravina Island during 1927. Only one was recaptured, which was taken at Guard Islands, Clarence Strait, in eight days.

CONCLUSIONS

Although the experiments of 1927 involved the tagging of relatively few fish distributed among eight quite distinct localities, the results have corroborated the previous experiments to a remarkable degree. The percentages of recoveries are approximately the same as those obtained in 1924, 1925, and 1926, and are collected in Table 15.

TABLE 15.—Percentage of tagged fish recaptured, 1927. Total number tagged, 4,668; total number recaptured, 1,506; percentage recaptured, 32.2

Locality where tagged	Red	Pink	Chum	Coho	King	Locality where tagged	Red	Pink	Chum	Coho	King
Icy Strait.....	27.1	37.7	19.2	18.0	-----	Point Hobart.....	17.8	36.5	17.5	-----	-----
Chatham Strait.....	25.0	32.1	33.5	17.6	15.3	Point Colpoys.....	30.8	40.2	-----	21.4	-----
Hourigan Point and Carroll Island.....	20.0	48.6	26.1	20.6	-----	Cape Decision.....	13.7	25.0	10.9	4.1	-----
Cape Bendel.....	10.0	45.2	20.4	14.2	33.3	Gravina Island.....	54.5	23.6	5.7	9.0	-----

The routes of migration are virtually identical with those shown in the earlier work, and in most instances the percentages of fish taking the various routes from a given tagging station are as nearly the same as might be expected. These were discussed in some detail in the report dealing with the experiments in 1926 (Rich and Suomela), and it does not, therefore, seem necessary to repeat that treatment here. The particular value of the experiments described in this report lies in the fact that they support so strongly the previous studies of the migration of salmon in the intricate channels of southeastern Alaska.

UGANIK BAY, 1927

Red salmon are taken in fairly large numbers in the fishery in Uganik Bay on the northern shore of Kodiak Island, particularly in two traps on the western shore. During the season of 1927 126,000 red salmon were reported as captured in this bay, and in 1926 the catch was over 274,000. It was suspected that these might belong to the Karluk River run, and to test this 700 red salmon were tagged and released on August 19 and 20, 1927, from the Broken Point trap of the San Juan Fishing & Packing Co. Three hundred and seventeen tags were taken later in the commercial fishery and were returned with data as to when and where the fish were captured. In addition to those taken in the commercial fishery 86 were observed to reach the Karluk counting weir on their way to the spawning grounds. Some of these were captured, but

the majority continued past the weir and doubtless ultimately reached the lake. The recoveries are shown in Table 16.

TABLE 16.—Returns from tags attached August 19 and 20, 1927, at San Juan trap No. 1, Broken Point, Uganik Bay, Kodiak Island, Alaska

Date of recapture	Locality of recapture													Total	
	Ugan- ik Bay	South Arm, Ugan- ik Bay	Cape Ugat	Chiefs Point	Spiri- don Bay	Uyak Bay	Uyak Bay or Seven- mile Beach	Kar- luk Beach	Kar- luk River	Lazy Bay	Vie- koda Bay	Rasp- berry Strait	Cook Inlet		Un- known
Aug. 19.....	1		1												2
Aug. 20.....	5														5
Aug. 21.....	1			5											6
Aug. 22.....	7	3				6	58								74
Aug. 23.....	8				3	3									14
Aug. 24.....	1	4				10	12				1				28
Aug. 25.....	5					4						2			11
Aug. 26.....	8					3	5								16
Aug. 27.....	4					14	16	6					1		41
Aug. 29.....							11								11
Aug. 30.....	5						2								7
Aug. 31.....					1		11								12
Sept. 1.....	1	5									2				8
Sept. 2.....		1					1								2
Sept. 3.....							2								2
Sept. 4.....								21							21
Sept. 5.....						3	3	13							19
Sept. 6.....							1								1
Sept. 7.....								21							21
Sept. 8.....							1	2							3
Sept. 9.....								1							1
Sept. 10.....						1	1								2
Sept. 14.....								2							2
Sept. 15.....								1							1
Sept. 17.....								2							2
Sept. 18.....								11							11
Sept. 19.....								5							5
Sept. 20.....								1							1
Doubtful.....	18		7	2	5	47			3			1	1		74
Total.....	54	13	8	7	9	44	47	124	86	3	3	2	2	1	403

¹ Reported taken between Aug. 24 and 27.

² Reported taken between Aug. 20 and 22.

³ Reported taken between Aug. 20 and 27.

⁴ Reported taken between Aug. 20 and 30.

⁵ Reported taken between Aug. 27 and 28.

An examination of this table shows conclusively that the red salmon taken during the latter part of August in the traps along the western shore of Uganik Bay are predominantly derived from the Karluk River run. The 13 that were taken in the southern arm of Uganik Bay were probably, although not certainly, bound for a stream entering the east arm of the bay, which was formerly very productive but is now depleted so seriously that the run amounts to very little. Three were taken in the region of Alitak and presumably represent an element of the Alitak run that passes the northern shore of Kodiak Island during the spawning migration. Seven were taken to the eastward of Uganik Bay, including two taken in Cook Inlet, and one was returned without data as to when and where it had been recaptured. All of the others—399 out of a total of 423 (94.5 per cent)—were taken either at Karluk or at some point between the place where the tagging was done and Karluk, or were reported on their way up Karluk River to the spawning grounds.

The percentage of recoveries was unusually high—57.6 per cent—but this includes 86 fish that were counted through the weir maintained by the Bureau of Fisheries in Karluk River. If we consider only the fish that were taken in the commercial

fisheries, the number of recaptures is 317, or 45.2 per cent. Although this is still a higher percentage of recovery than has usually been reported from similar tagging experiments, it is within the range of the previous results. The recovery of so many tagged fish shows that the fishery is carried on with a considerable intensity in this district, and it can not be doubted that, were it not for the controlled escapement, the catch of Karluk red salmon would be greatly in excess of the 50 per cent required by law.

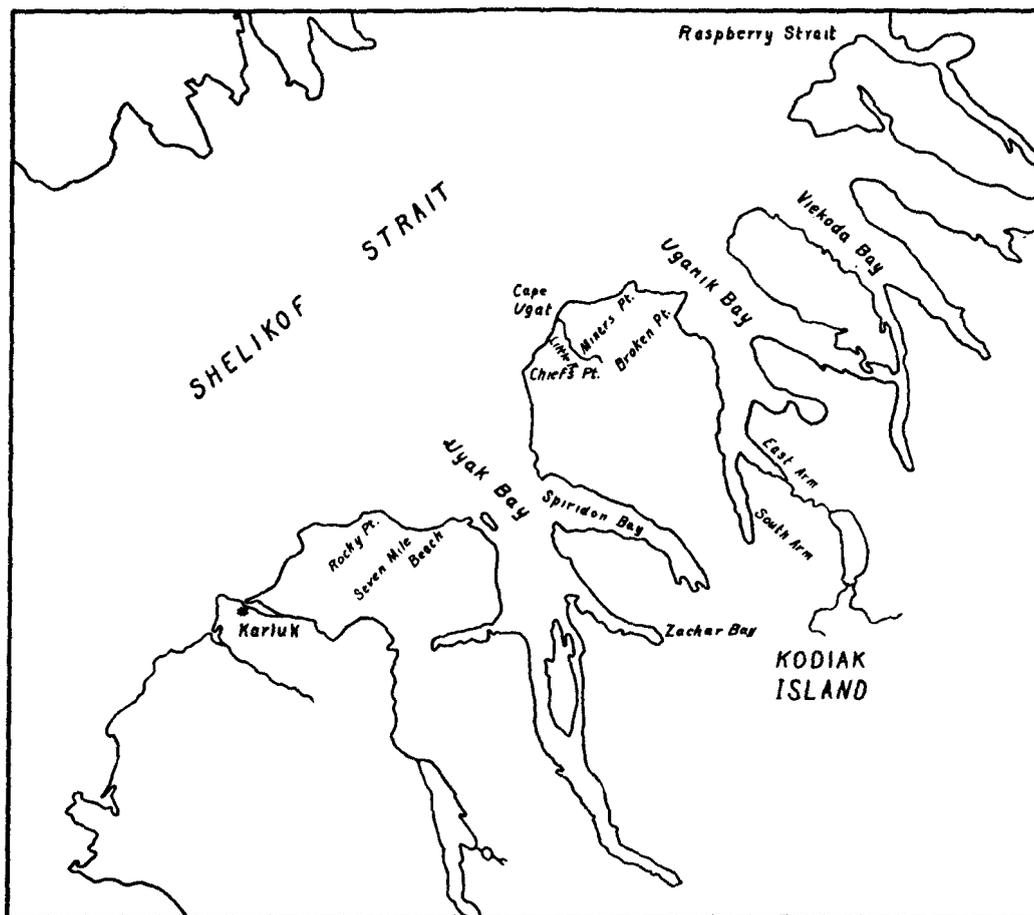


FIGURE 1.—Northwestern part of Kodiak Island, Alaska

It will be noted that over 40 per cent of the tagged salmon were not accounted for, in spite of the facts that the results show that a majority of the fish were bound for the Karluk River, and that the weir in the Karluk River gives opportunity to observe the fish that entered this stream. Without much doubt, this discrepancy is due to the fact that it is impossible to observe carefully all of the fish as they pass through the weir. They are usually moving rapidly and may be as much as 3 feet below the surface of the water. Under such conditions it is inevitable that tagged fish would pass through without being noted, and we believe that this accounts for a large part of the 40 per cent that was unaccounted for.

The rate of travel indicated by the returns is fairly rapid, corresponding, in general, to the rate observed in the experiments on the Alaska Peninsula in 1922 and

1923. Uyak Bay is only some 20 miles from the point of tagging, and Karluk Beach, where most of the tagged fish were recaptured, is about 20 miles farther on to the westward. Fifty-eight tagged fish were taken at Karluk Beach on the 22d, having traveled about 30 miles in 2 or 3 days. The actual rate of travel is more rapid than is indicated by the figures on account of the lapse of time between the actual capture and the finding of the tags. (See Gilbert and Rich.)

It is not known whether these traps in Uganik Bay take Karluk red salmon throughout the season, and it is purposed to secure data that will solve this problem. In the light of our present definite knowledge, however, we must include the Uganik catch of red salmon in the total for the Karluk run, just as is done in the case of the red salmon taken in Uyak Bay.

NICHOLASKI SPIT, 1928

This experiment was designed to test the theory that the red salmon taken at Nicholaski Spit were part of the same run that passes the Shumagin Islands and Morzhovoi and Ikatan Bays, which has been shown by the experiments of 1922 and 1923 to consist largely of Bristol Bay fish. Nicholaski Spit is situated on the western shore of Pavlof Bay, Alaska Peninsula, about halfway between the Shumagin Islands and the end of the peninsula. The fishery here is of recent development, a trap having been driven in 1924 and operated every year since. The late Dr. C. H. Gilbert examined scales of red salmon from this locality and found indications that the catches contained a considerable percentage of Bristol Bay fish. More recent statistical studies also have shown a distinct correlation in the size of the catches at Nicholaski Spit and in Ikatan and Morzhovoi Bays,³ a fact that lent further probability to this theory.

As originally planned, this experiment was to have been carried out during the height of the red-salmon run in the Ikatan-Shumagin Island district, but additional regulations prevented fishing at Nicholaski Spit until after the 1st of July. Other circumstances made it impossible to tag immediately after the fishing season opened, and it was not until July 11 that the first tags were attached. The main part of the Bristol Bay run has passed through the Ikatan-Shumagin Island district before this time, so that the experiments can not be taken as accurately representing the condition at Nicholaski Spit earlier in the season. In spite of these deficiencies, however, the data show a distinct migration to the westward and into Bering Sea, where tags were taken at Bear River and in Bristol Bay. It seems safe to conclude, in view of all the lines of evidence available, that the fish that pass Nicholaski Spit earlier in the season include Bristol Bay fish, probably in about the same proportion as do the runs in the Shumagin Islands and at Ikatan.

Four hundred and sixty-one tags were attached as follows: 300 on July 11, 74 on July 12, and 87 on July 17. Only 30 tags were recovered (6.5 per cent). This relatively low percentage of recaptures is probably due to the fact that the tagging was done so late in the season. The returns are given in Table 17.

³ Statistical Review of the Alaska Salmon Fisheries. Part I: Bristol Bay and the Alaska Peninsula. By Willis H. Rich and Edward M. Ball. Bulletin, U. S. Bureau of Fisheries, Vol. XLIV, 1928, pp. 41-95. Bureau of Fisheries Document No. 1041.

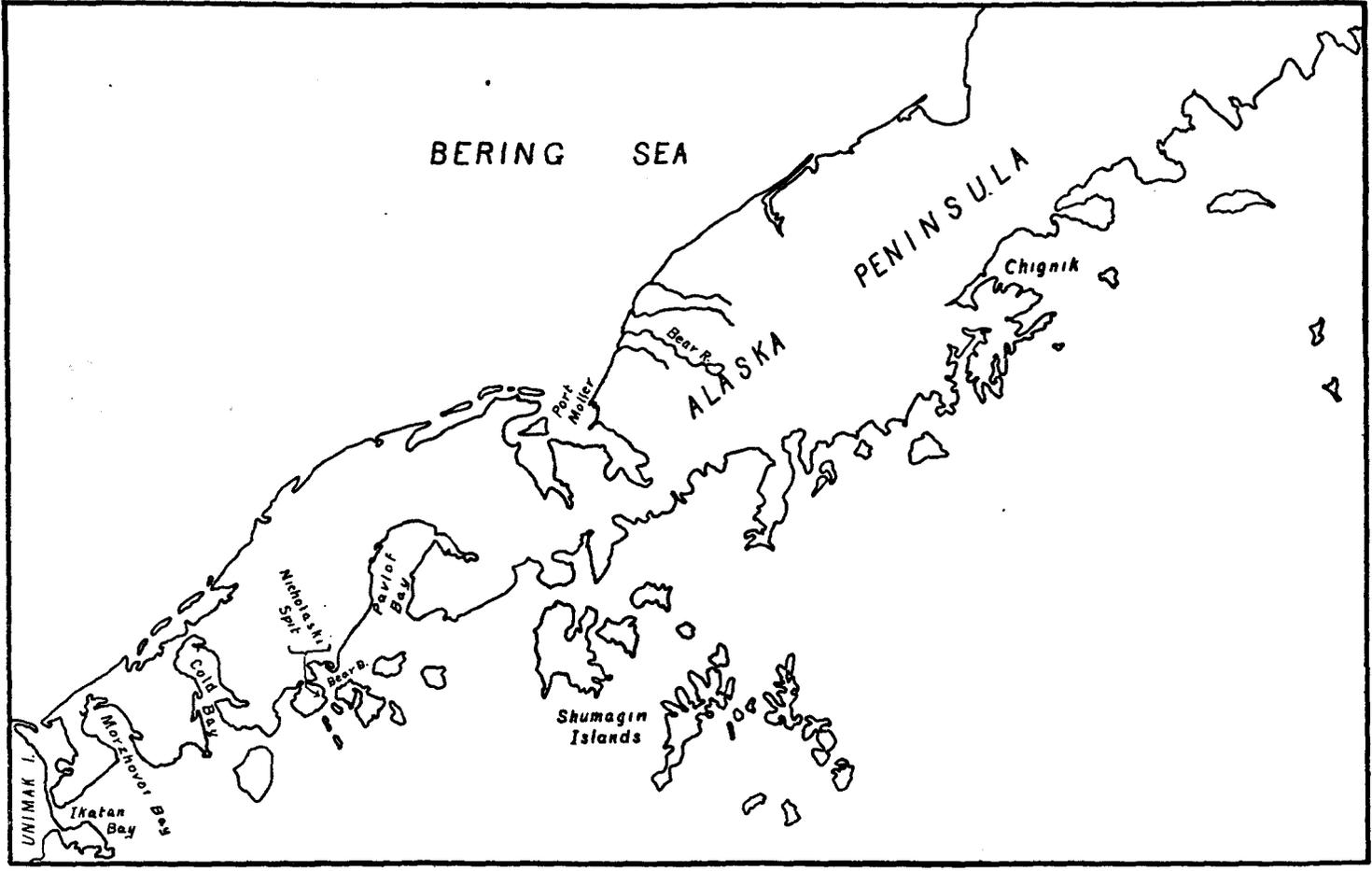


FIGURE 2.—Part of the Alaska Peninsula

TABLE 17.—Returns from 462 red salmon tagged at Nicholaski Spit, Alaska Peninsula, July 11, 12, and 17, 1928

Locality of recapture	Date of tagging						Total number recaptured
	July 11		July 12		July 17		
	Number	Days	Number	Days	Number	Days	
Nicholaski Spit.....	3	0	1	11	2	4-6	6
Long Johns Lagoon, Pavlof Bay.....	1	12	1	11	2	6-8	4
Bear Bay.....					1	2	1
Pavlof Bay.....	1	14			1	6	2
Morzhovoi Bay.....	2	4					2
Ikatan Bay.....	3	5	1	4	1	(1)	5
Bear River.....	1	8					1
Bristol Bay.....	1	18					1
Chignik.....	1	17	2	17-26	1	15	4
Little River.....	1	9					1
Uganik Bay.....	1	15			1	16	2
Cook Inlet.....	1	21					1
Total.....	16		5		9		30
Percentage returned.....	5.3		6.8		10.3		6.5

¹ Reported taken before date of tagging.

It will be seen at once that the most important migration is to the westward and particularly into the region of Ikatan and Morzhovoi Bays. Approximately one-fourth of the recaptured tags came from these two localities. The movement from Nicholaski Spit to Ikatan and Morzhovoi Bays was very prompt—from four to five days—and in this respect the migration resembles that of the Bristol Bay fish that pass from the Shumagin Islands to Ikatan and Morzhovoi Bays. (See Gilbert, 1923, and Gilbert and Rich, 1925.) These facts lend strong support to the theory that many of the red salmon that pass Nicholaski Spit belong to the same schools that provide the fishery in the Shumagin Islands, and the single return from Bristol Bay is conclusive evidence that at least some of these fish were bound for the streams in that district. It is not surprising that more fish were not taken in Bristol Bay, because the red-salmon fishery there closed on July 23—only 12 days after the first fish were tagged at Nicholaski Spit.

Although the evidence points conclusively to the Bristol Bay origin of a large percentage of the Nicholaski Spit fish, there is also a surprisingly large migration to the eastward, fish being taken at Chignik, Kodiak Island, and Cook Inlet. The earlier experiments in the Alaska Peninsula region had given no indication of any such extensive migration to the east. Most of these earlier experiments were conducted earlier in the season, however, and so were not directly comparable. Some of the later experiments in 1923, however, did show a distinct tendency toward an easterly migration, although by no means as well marked as in the case of the experiments of 1928, in which more than 25 per cent of the returns came from Chignik, Kodiak, and Cook Inlet. There is obviously some indication here that the fishery in the Ikatan-Shumagin Island district does draw to a considerable extent, at least after about the 10th of July, upon the runs originating in streams, such as Chignik, situated to the eastward.